

**REMARKS**

Claims 1, 2, 6-8, 10, 13-18, 25 and 26 are pending in the application.

Applicant submits herewith corrected formal drawings. Applicant amends claim 26 to dependent on claim 25 - no estoppel is created. Also, Applicant amends claim 25 more clearly to define the features of an apparatus as recited therein (see, for Example, Applicant's Figs 19 and 20).

The Examiner rejects all of the pending claims under 35 U.S.C. §103(a):

- claims 1, 2, 6, 7 and 10 as being unpatentable over the previously-cited Kondo et al., "Fabrication Of Long-Period Fiber Gratings By Focused Irradiation Of Infrared Femtosecond Laser Pulses," *Optics Letters*, Vol. 24, No/ 10, May 15, 1999 (Kondo) in view of a **newly-cited Bilodeau et al.** (Bilodeau);
- claim 8 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of the previously-cited Kircher.
- claim 13 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of the previously-cited Kershaw;
- claim 14 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of the previously-cited Koops et al. (Koops);
- claim 15 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of a **newly-cited Starodubov**;
- claim 16 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of a **newly-cited Modavis et al.** (Modavis);
- claim 17 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of a **newly-cited Albrecht et al.** (Albrecht) - WO 99/52003 which corresponds to U.S. Patent No. 6,591,034;
- claim 18 as being unpatentable over Kondo in view of **Bilodeau**, and further in view of a **newly-cited Komatsu**;
- claim 25 as being unpatentable over Kondo in view of the previously-cited Hill et al. (Hill); and
- claim 26 as being unpatentable over Kondo in view of Hill and further in view of a **newly-cited Katayama et al.** (Katayama).

Applicant respectfully traverses the prior art rejections as follows.

As explained in Applicant's previous amendment, Kondo discloses a method for fabricating long-period fiber gratings using focused irradiation of infrared femtosecond laser pulses having a pulse width of 120 femtoseconds. That is, in Kondo, the optical fiber is subjected to irradiation to form fiber gratings.

With regard to the Examiner's rejection of Applicant's independent claim 1, Bilodeau discloses a method for augmenting the photosensitivity of weakly photosensitive high silica Ge-doped core optical waveguides to ultraviolet light by "locally heating a portion of a weakly photosensitive optical waveguide for a period of time sufficient to increase the density of defects in the waveguide to a level required to enhance the waveguide's photosensitive response" (see Id., col. 1, line 52 through col. 2, line 7; and Fig. 1). In particular, Bilodeau discloses a method where "the region of weakly (including negligibly) photosensitive optical waveguide that is to be photosensitized is "brushed" repeatedly by flame 5" (see Id., col. 1, lines 46-67). In Fig. 2 (cited by the Examiner) Bilodeau shows "a plot of the maximum (saturated) photoinduced index change observed in Corning SMF-28 fiber as a function of processing time under the flame brush" (see Id., col. 3, lines 9-11).

Thus, Bilodeau, which is directed to thermal treatment by flame brushing, teaches away from Applicant's claimed invention as claimed in claim 1, which requires (as acknowledged by the Examiner) that the laser rays are irradiated to the core section for heating the core section as well as for modifying the refractive index of the core section, thereby making thermal treatment unnecessary. *See MPEP §2141.02* (prior art must be considered in its entirety, including disclosures that teach away from the claims).

Furthermore, in contradistinction to Applicant's claimed invention, which requires a pulse width of not more than 30 pico-seconds", Bilodeau teaches "UV light exposure conditions" where "pulse duration = 12 nsec" (see Id., col. 2, lines 11-14).

The Examiner alleges that in Kondo "the rays are irradiated for heating as well as modifying the refractive index, thereby making thermal treatment unnecessary" (see Office Action, page 3, lines 5 and 6). Thus, contrary to the Examiner's analysis, one skilled in the art would not have been motivated to combine the teaching of Kondo, where long-period fiber gratings are fabricated using focused irradiation of infrared femtosecond laser pulses having a pulse width of 120 femtoseconds, with the teaching of Bilodeau where maximum (saturated) index change in a fiber is achieved by flame brushing under UV light exposure condition where pulse duration is 12 nanosecond. *See* MPEP §2143.01 (proposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference) *and* MPEP §2145(X)(D)(2) ("[i]t is improper to combine references where the references teach away from their combination" *citing In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983)).

None of the cited prior art references, supply the motivation or the teaching lacking in Kondo and Bilodeau. Thus, Applicant's independent claim 1 and its dependent claims 2, 6-8, 10, and 13-18 (which incorporate all the novel and unobvious features of their base claim) would not have been obvious from any reasonable combination of the cited prior art references.

With regard to Applicant's independent claim 25, this claim provides an apparatus comprising a unique combination of features, including, *inter alia*, a planar slab wave-guide

where at least a portion of a surface shape (which is irradiated with the laser rays) of the planar slab wave-guide is convex to act as a lens to focus the irradiated rays to the core section of the optical wave-guide. On the other hand, Hill discloses nothing more than an optical fiber having a round surface, where:

It has been found that fiber cladding forms a cylindrical lens focusing the light toward the core of the fiber, thus reducing the effect of the mask being at various distances from the surface of the core (see Id., col. 5, lines 37-42).

Nowhere does Hill, nor Katayama (cited by the Examiner with respect to claim 26), disclose or suggest a device having a planar slab wave-guide, let alone a planar slab wave-guide having convex portion to act as a lens to focus the irradiated rays to the core section of the optical wave-guide, as recited in Applicant's claim 25.

Thus, Applicant's independent claim 25 and its dependent claim 26 (which incorporates all the novel and unobvious features of its base claim) would not have been obvious from any reasonable combination of the cited prior art references.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.116  
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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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